ISSN (print) 0093-4666 © 2013. Mycotaxon, Ltd. ISSN (online) 2154-8889

MYCOTAXON

http://dx.doi.org/10.5248/125.149

Volume 125, pp. 149–164 *July–September 2013*

Contributions to the family *Thyridiaceae*. New data on *Sphaeria mutabilis*

Julia Checa, M. Natividad Blanco & Gabriel Moreno

Dpto. de Ciencias de la Vida, Facultad de Biología, Universidad de Alcalá, Alcalá de Henares, Madrid 28871 Spain

* Correspondence to: *julia.checa@uah.es*

Abstract — Type specimens of the genera *Balzani*a, *Mattirolia*, *Thyridium*, and *Thyronectroidea* were studied. We accept *Mattirolia* (five species) and *Thyridium* (four species) in the *Thyridiaceae* and regard *Balzania* and *Thyronectroidea* as synonyms of *Mattirolia*. The occurrence of *Mattirolia roseovirens* in Spain represents only the second collection since its original description. Four new combinations are proposed: *Mattirolia mutabilis*, *M. ohiensis*, *M. platensis*, and *Thyridium lasiacidis*. Lectotypes are designated for *M. mutabilis* and *M. ohiensis*. A key is provided to species in the *Thyridiaceae*.

Key words — *Ascomycota*, *Lasiella mutabilis*, systematics, taxonomy

Introduction

The yellowish color that appears in the fruiting bodies of some *Pyrenomycetes* sensu lato has raised confusion among mycologists throughout history, e.g., Quélet (1875), Saccardo (1883), Winter (1884–87), and Munk (1957). Although the coloration suggests the order *Hypocreales*, detailed microscopic studies indicate that species with yellow ascomata can be very different and phylogenetically distant.

While studying samples on logs and dead branches of *Genista scorpius* (L.) DC. (*Fabaceae*), a number of fungi with yellow ascomata were collected that do not belong in the *Hypocreales*. This scrub tree is common in the green oak forest of Tamajón (Guadalajara, Spain) growing on basic ground limestone. These samples were identified as *Mattirolia roseovirens* representing the family *Thyridiaceae* (*Sordariomycetidae*), although macroscopically they resembled *Pseudotrichia mutabilis* in the *Pleosporomycetidae*.

The study of these samples led us to revise species in *Thyridiaceae* for comparison with other species having yellow ascomata. The *Thyridiaceae*

previously studied by Yue & Eriksson (1987), Eriksson & Yue (1989), Barr (1990), and Eriksson & Hawksworth (1991), currently consist of five genera and 22 species (Kirk et al. 2008), although Lumbsch & Huhndorf (2010) have accepted only four genera. Most of the studied species have been collected only once and are represented only by type specimens, which are generally old and currently of uncertain taxonomic position. In this paper, we provide an account of two genera with nine species accepted in the *Thyridiaceae*.

Materials & methods

Mattirolia roseovirens was collected on *Genista scorpius* during surveys carried out in the spring of 1996 and 2008 at Tamajón (Guadalajara, Spain). Specimens are deposited in AH and compared with other *M. roseovirens* specimens, including the type material from BPI, FH, and S. These collections were compared with other species of the *Thyridiaceae* from the herbaria B, K, LPS, NY, UME, including type specimens of *Balzania platensis*, *Sinosphaeria lasiacidis, Teichospora ohiensis*, *Thyronectria chrysogramma*, and *Thyridium flavum*. Fries' specimen of *Sphaeria mutabilis* and Quélet's specimen of *Lasiella mutabilis* are from UPS.

Collections were examined with a binocular microscope after mounting in 5% KOH. Spore measurements were made under a 100× oil immersion objective. Micrographs were taken with a Nikon (Eclipse 80i) microscope and a digital camera Nikon (DS-5M).

Taxonomy

Taxonomy of the *Thyridiaceae*

Yue & Eriksson (1987) established the family *Thyridiaceae* for *Sinosphaeria* and *Thyridium*. *Sinosphaeria bambusicola,* found on bamboo in China, is characterized by yellowish stromata with immersed ascomata that react with KOH to produce a reddish color and by the presence of irregularly brown dictyospores with thick darkened septa. *Thyridium* differs in producing KOH negative stromata in which the immersed ascomata have convergent ostioles and uniformly brown dictyospores.

Eriksson & Yue (1989) recognized *Thyridium* with *Bivonella* and *Sinosphaeria* as synonyms. They compared *T. chrysomallum* (≡ *Bivonella chrysomalla,* = *Sinosphaeria bambusicola*) with *T. flavum* (Petch 1917), which has a yellow subcortical, KOH negative stroma, ostioles not uniformly convergent, and dark brown dictyospores. This resulted in a broadly defined genus that accommodated varying stromatal structures and ascospore characters.

Samuels & Rogerson (1989) described *Sinosphaeria lasiacidis* on *Lasiacis ligulata* Hitchc. & Chase (*Poaceae*) from French Guiana. They stated that their species differed from *S. bambusicola* mainly by the smaller ascospores [(9–)9.8–11.6(–12.6) × (4.5–)5–5.8(–6.3) µm versus (12.5–)14–16.5(–17.5) × (6–)6.5–7.5 µm for *S. bambusicola* (= *T. chrysomalla*)].

Barr (1990) did not consider *Bivonella* to be a synonym of *Thyridium* because the type species of *Bivonella* (= *Sinosphaeria*) has periphysoids, which she could not find in *T. vestitum*. She accepted *Thyridiaceae* for these two genera and added *Valsaria* Ces. & De Not. and *Valsonectria* Speg., both with uniseptate ascospores. *Valsaria* currently falls within the *Diaporthales* and *Valsonectria* in the *Hypocreales* (Kirk et al. 2008).

Rossman et al. (1999) separated *Balzania*, *Mattirolia* and *Thyronectroidea* from the *Hypocreales* based on the paraphyses and included them in the *Thyridiaceae*. They also transferred *Calyptronectria ohiensis* to *Thyridium* as *T. ohiense*.

Genera included in *Thyridiaceae*

After studying numerous type specimens we accept the *Thyridiaceae* with two genera, *Mattirolia* (with five species) and *Thyridium* (with four species). A key to these genera and species is provided below.

Mattirolia Berl. & Bres., Annuario Soc. Alpin. Trident. 14: 351 (1889)

Type species: *Mattirolia roseovirens* Berl. & Bres.

= *Thyronectroidea* Seaver, Mycologia 1: 206 (1909)

Type species: *Thyronectroidea chrysogramma* (Ellis & Everh.) Seaver [≡ *Mattirolia chrysogramma*].

= *Balzania* Speg., Anales Mus. Nac. Buenos Aires 6: 286 (1898)

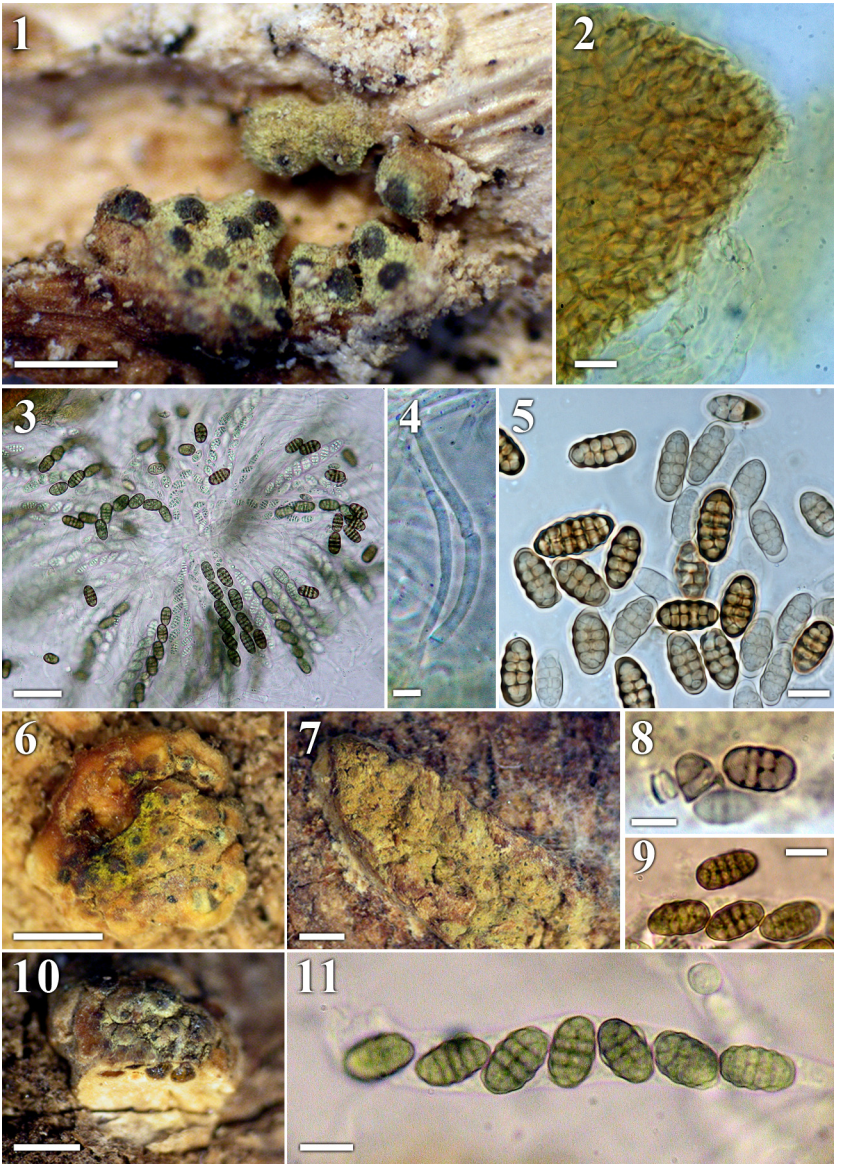
Type species: *Balzania platensis* Speg. [≡ *Mattirolia platensis*].

Stroma variable, usually present, erumpent, covered with loosely interwoven yellowish or brownish hyphae, KOH negative. Perithecia globose, semi-immersed or isolated in the stroma. Paraphyses abundant. Asci unitunicate, cylindrical or clavate, non amyloid. Ascospores smooth, muriform, hyaline to greenish yellow when mature.

Mattirolia roseovirens Berl. & Bres., Annuario Soc. Alpin. Trident. 14: 351 (1889) Figs. 1–11

Type: ITALY. Trento, Muralta, on branches of *Cytisus laburnum*, 14 April 1888, leg. G. Bresadola (type F115389 in S); FH 258826 (Patouillard sheet number 6749, probably an isotype).

Stroma subcortical, pulvinate, 0.5–6 mm diam. Perithecia aggregated, immersed in the stroma or more rarely isolated, globose, 400–450 µm diam., black, surrounded by a yellowish tomentum, 30–50 µm thick, formed by hyphae 4–5 µm diam. Peridium pseudoparenchymatous, orange, composed of isodiametric cells, 5–15 µm diam. Paraphyses 5 µm diam, regularly septate, sometimes with free ends. Asci unitunicate, cylindric, 100–120 × 12–15 µm, with 8 uniseriate ascospores. Ascospores greenish-brown, ellipsoid to oblong, 18–21 × 9–11 µm, with 3–5(–7) non-constricted, transverse septa and



Figs. 1–11. ***Mattirolia roseovirens*** (AH 39966): 1. Surface of stroma and perithecium. 2. Peridial cells and hyphae of the tomentum. 3. Asci and ascospores. 4. Paraphyses. 5. Ascospores. ***M. roseovirens*** (FH 258826): 6–7. Stromata. 8–9. Ascospores. ***M. roseovirens*** (S 115389 type): 10. Stroma. 11. Ascus with ascospores. Scale bars: 1 = 0.5 mm; 2, 4, 5, 8, 9, 11 = 10 µm; 3 = 50 µm; 6, 7, 10 = 1 mm.

1 longitudinal septum that includes the end cells, smooth and surrounded by a gelatinous sheath sometimes located only around ends.

Additional specimens examined, **ITALY**. **Veneto**, Patavii, 1889, leg. P.A. Saccardo, det. Berlese (BPI 553005 ex Herb. Saccardo [labelled as ex type, but specimen data do not correspond to type]); **Trentino**, Trento, in ramis corticalis Cytisi laburni, II-1890 (S ex Herb. Bresadola F115390, ex Herb. Mycolog. Lars Romell. F115391, F115392). **SPAIN. Guadalajara,** Tamajón, Enebrales´s hermitage, on branches of *Genista scorpius*, 18-V-1996, leg. H.O. Baral (AH 39966); 25-IV-2008, leg. J. Checa & M.N. Blanco (AH 39959, AH 39960, AH 39961, AH 39962, AH 39963); 22-V-2008 (AH 39233, AH 39964, AH 39965, AH 39967).

Remarks— This species is known from two related hosts in the *Fabaceae, Cytisus laburnum* and *Genista scorpius*.

Mattirolia chrysogramma (Ellis & Everh.) Sacc., Syll. Fung. 9: 993 (1891)

Figs 12–16

≡ *Thyronectria chrysogramma* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 42: 245 (1890)

≡ *Thyronectroidea chrysogramma* (Ellis & Everh.) Seaver, Mycologia 1: 206 (1909)

≡ *Nectria chrysogramma* (Ellis & Everh.) Rossman, Mem. New York Bot. Gard. 49: 259 (1989)

Specimens examined, **USA**, **Kansas**, Manhattan, on bark of *Ulmus americana*, March 1889, Kellerman & Swingle 1421 (NY 00927545, holotype); **New York**, Potsdam, on elm limbs, Ellis 286 (NY 00927565, paratype).

Remarks— This is the type species of *Thyronectroidea*. The holotype specimen is depauperate, but the paratype includes numerous mature ascomata (Rossman et al. 1999). The appearance of this species is similar to *Mattirolia roseovirens,* and the ascospores have a greenish color. We recognize this species as *M. chrysogramma* and consider *Thyronectroidea* a synonym of *Mattirolia,* as suggested by Rossman et al. (1999).

Mattirolia mutabilis (Sacc.) Checa, M.N. Blanco & G. Moreno, **comb. nov.**

MycoBank MB 805470 Figs 17–25

≡ *Pleosphaeria mutabilis* Sacc., Syll. Fung. 2: 306 (1883)

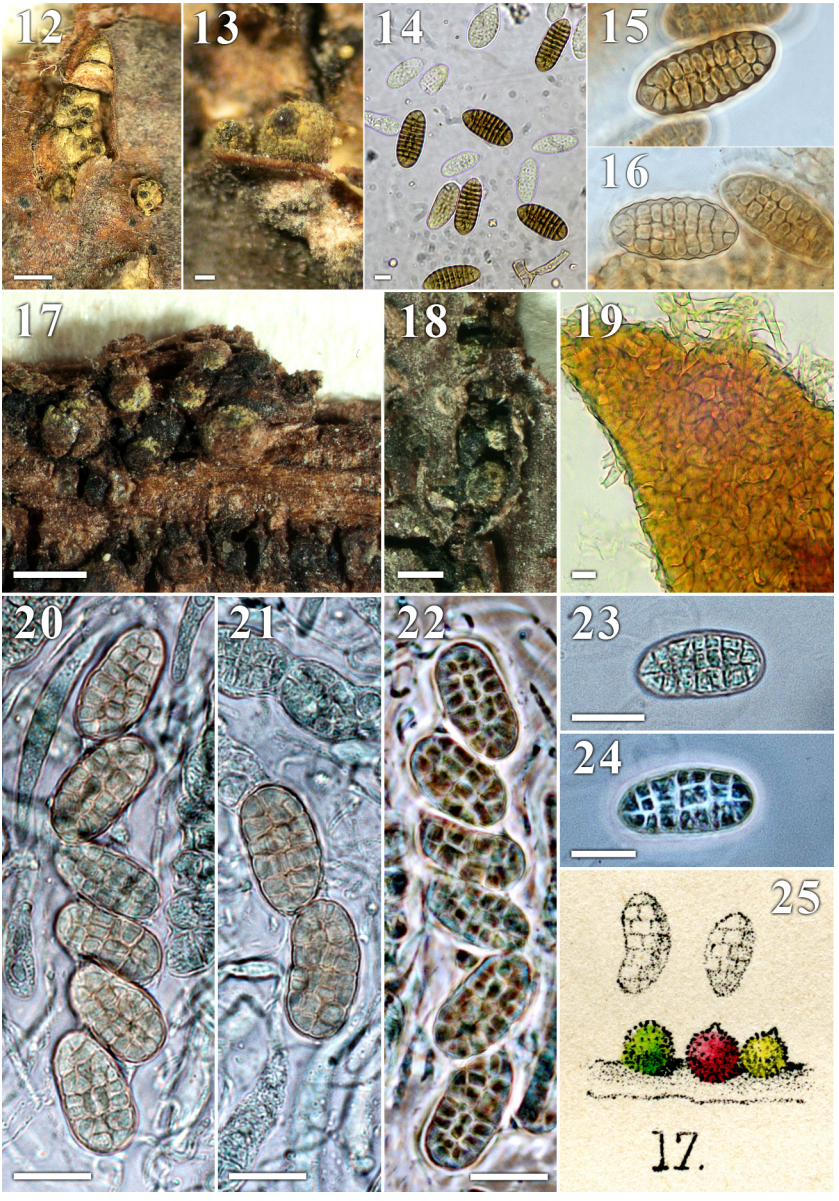
≡ *Strickeria mutabilis* (Sacc.) G. Winter, Rabenh. Krypt.-Fl., ed. 2, 1(2): 288 (1885)

Misapplied name: "*Lasiella mutabilis*" sensu Quélet, Mém. Soc. Émul. Montbéliard, 2e série, 5: 517 (1875)

Invalid name: "*Teichospora* cfr. *mutabilis*" Munk, Dansk Bot. Ark. 17(1): 394 (1957)

Type: FRANCE. Jura, La Bouloie, Saule marceau (*Salix*), leg. Lucien Quélet 406223 (**Lectotype designated here**, UPS F-126406, as *Sphaeria mutabilis*).

Stroma sometimes present. Perithecia subglobose to globose, 400–700 µm diam., superficial, scattered or aggregated, covered with a yellowish or yellow-brownish tomentum. Asci 80–90 × 10–15 µm, unitunicate, cylindrical-clavate, with 8 uniseriate ascospores or biseriate toward apex. Paraphyses 3–5 µm diam,



Figs. 12–25. ***Mattirolia chrysogramma*** (Ellis 286, NY 00927565 paratype): 12. Stromata. 13. Detail of stroma. 14. Ascospores. 15–16. Detail of ascospores. ***M. mutabilis*** (UPS 406223 (F-126406) lectotype): 17–18. Perithecia. 19. Peridial cells. 20–22. Asci with ascospores. 23–24. Detail of ascospores. ***M. mutabilis***: 25. Quélet's original drawing. Scale bars: 12, 17 = 1 mm; 13, 18 = 0.5 mm; 14–16, 19–24 = 10 µm.

abundant, hyaline, filiform, septate, cylindrical, with obtuse apex. Ascospores 19–22 × 8–12 µm, ellipsoid with rounded ends, muriform, 5–7 transverse septa and 1–2 longitudinal, pale septa, hyaline to pale yellow-greenish.

Remarks— *Mattirolia mutabilis* is characterized by unitunicate asci and hyaline to yellow-greenish muriform ascospores as well as isolated or grouped perithecia without a typical stroma; the perithecia are covered by a yellowish tomentum unlike in *Pseudotrichia mutabilis* (Table 1). Quélet (1875) recombined *Sphaeria mutabilis* as *Lasiella mutabilis*, but his interpretation and specimen do not match the original sense of Persoon's *S. mutabilis*, and this has caused later authors to misinterpret this name. Some authors have misinterpreted Quélet's publication of *Lasiella mutabilis* as creating a valid sp. nov. based on his description. However, this view is a nomenclatural error, because Quélet explicitly published *Lasiella mutabilis* as a valid and legitimate comb. nov. based on Persoon's *Sphaeria mutabilis;* he was therefore taxonomically misapplying this name when he attached it to his description of a different new species. Quélet's species acquired a valid name only when Saccardo (1883) renamed it as *Pleosphaeria mutabilis*, which is the correct basionym for all subsequent combinations. *Pleosphaeria mutabilis* is placed in the genus *Mattirolia* rather than *Lasiella,* now considered to be a synonym of *Lasiosphaeria* Ces. & De Not., because the ascospores of the latter are subcylindrical to sigmoid and have only transverse septa (Hilber & Hilber 1983; Miller & Huhndorf 2004; Munk 1957).

Mattirolia ohiensis (Ellis & Everh.) Checa, M.N. Blanco & G. Moreno, **comb. nov.**

MycoBank MB 805467 Figs 26–28

≡ *Teichospora ohiensis* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 46: 329 (1894)

≡ *Strickeria ohiensis* (Ellis & Everh.) Kuntze, Rev. Gen. Pl. 3(3): 534 (1898), as "*Strickera ohioensis*"

≡ *Calyptronectria ohiensis* (Ellis & Everh.) M.E. Barr, Mycotaxon 18: 155 (1983)

≡ *Thyridium ohiense* (Ellis & Everh.) Rossman & Samuels, Stud. Mycol. 42: 176 (1999)

Type, USA. Ohio, Preston, on hard dry wood, leg. A.P. Morgan 1012 (**Lectotype designated here**, NY Ellis collection, 00927519; **isolectotype**, NY 00927520).

Remarks— Barr (1983) placed this species in *Calyptronectria* and suggested that it could be related to *Thyronectria* but lacked a stroma. *Calyptronectria* is now placed in the *Melanommataceae* (Kirk et al. 2008). Based on our examination of the type specimen, this species belongs in *Mattirolia*.

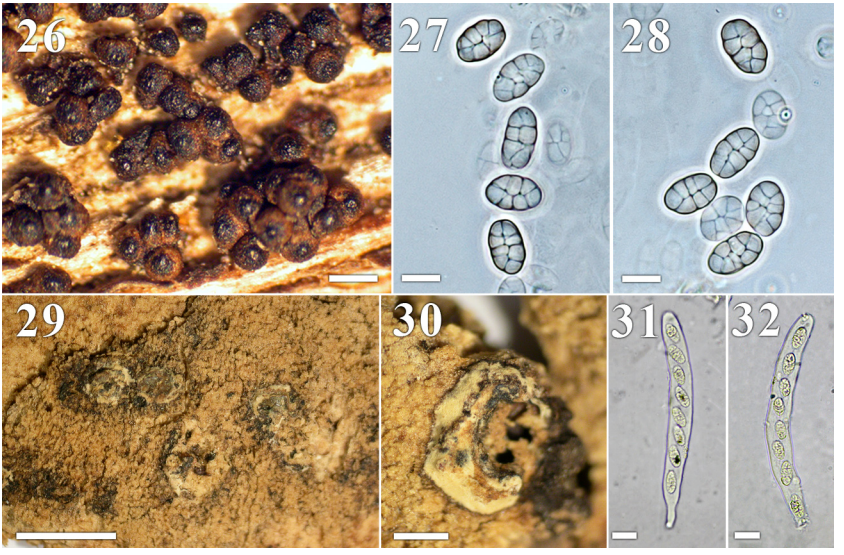
Mattirolia platensis (Speg.) Checa, M.N. Blanco & G. Moreno, **comb. nov.**

MycoBank MB 805468 Figs 29–32

≡ *Balzania platensis* Speg., Anales Mus. Nac. Buenos Aires 6: 286 (1898)

= *Mattirolia nivea* Speg., Anales Mus. Nac. Buenos Aires 6: 292 (1899)

≡ *Leucocrea nivea* (Speg.) Sacc. & P. Syd., Natürl. Pflanzenfam. 1(1**): 540 (1900)



Figs. 26–32. ***Mattirolia ohiensis*** (NY 927519, type): 26. Perithecia. 27–28. Detail of ascospores. ***M. platensis*** (LPS 1645, holotype): 29. Stromata. 30. Detail of stroma. 30. Ascospores. 31–32. Asci and ascospores. Scale bars: 26 = 0.5 mm; 27, 28 = 10 µm; 29 = 5 mm; 30 = 1 mm: 31, 32 = 20 µm.

Specimen examined, **ARGENTINA**. La Plata, on bark of dead trunks of *Ailanthus glandulosa*, Aug 1891, C. Spegazzini (LPS 1645, holotype).

Remarks—Although this specimen is in poor condition, we were able to observe it macro- and microscopically. The asci are unitunicate and the ascospores are muriform, hyaline to yellowish; thus we include it in *Mattirolia*.

The holotype specimen of *Mattirolia nivea* (LPS-1704) was examined and considered a synonym of *B. platensis* by Rossman et al. (1999).

Thyridium Nitschke, Pyrenomycetes Germanici 1: 110 (1867)

Type species: *Thyridium vestitum* (Fr.) Fuckel

= *Bivonella* (Sacc.) Sacc., Syll. Fung. 9: 989 (1891)

Type species: *Bivonella lycopersici* (Pass.) Sacc.

= *Sinosphaeria* J.Z. Yue & O.E. Erikss., Syst. Ascom. 6: 231 (1987)

Type species: *Sinosphaeria bambusicola* J.Z. Yue & O.E. Erikss.

Stromata present, immersed or erumpent, formed by interwoven yellowish, brownish or black hyphae and cells of the substrate, KOH positive (fuchsia) or KOH negative. Perithecia globose with short or long necks with convergent or separate ostioles, immersed. Asci cylindrical, inamyloid. Ascospores muriform, very pale brown to dark brown, or with thickened and pigmented septa.

Remarks— Eriksson & Yue (1989) emended *Thyridium* to incorporate *Bivonella* and *Sinosphaeria* as synonyms.

Thyridium vestitum (Fr.) Fuckel, Jb. nassau. Ver. Naturk. 23–24: 195 (1870) Figs 33–35

= *Fenestella ulmicola* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 45: 143 (1893)

Specimens examined, **AUSTRIA**, **Bohemia**, on *Sambucus racemosa*, 1873 (de Thümen 859, NY). **CANADA**, **Ontario**, London, on dead limbs of *Ulmus americana*, VIII-1892 (Holotype of *Fenestella ulmicola*-NY 00928688); on *Ribes lacustre*, 30-I-1894 (NY). **GERMANY**, on *Ribes rubrum*, VIII-1882, (NY); **Saxony**, Königstein, on *Sambucus racemosa*, XI-1882, leg. W. Krieger (de Thümen, 2254, NY); **Berlin**, on *Frangula alnus*, V-1887, leg. Sydow 2249, Mycotheca Marchica n. 1362 (NY); **Rhineland-Palatinate,** Oestrich (Nassau), on *Betula alba* and *Robinia pseudoacacia*, 1894, leg Fuckel (Herbier Barbey-Boissier, NY). **HUNGARY**, on *Colutea arborescens*, VI-1875, leg. Lojka (NY). **ITALIA**, **Veneto**, Treviso, Vitorio, on *Ribes grossularia*, IX-1897, (D. Saccardo 107, NY). **POLAND, Mazowieckie**, Warszawa-Goclawek, on *Elaeagnus angustifolia*, 25-IX-1960, leg. J. Kochman (J. Kochman Mycotheca Polonica in NY). **U.S.A. Iowa**, on *Carya* sp. (NY); **Massachusetts**, Baptist Hill, Conway, on old branch of *Berberis* sp., 23-XII-1979, coll. and det. M.E. Barr, 6652 (Herbarium of the University of Massachusetts in NY); on young dead branches of *Forsythia* sp., 15-IV-1961, coll. & det. M.E. Barr, 2872 (Herbarium of the University of Massachusetts in NY); Sunderland, on branches of *Betula* sp., 25-VIII-1963, coll. and det. M.E. Barr 4126 (NY). **Missouri**, on dead sprouts of *Platanus occidentalis*, 27-X-1897, leg. C.N. Demetrio (NY).

Remarks— Macroscopically this species is variable and occurs frequently on diverse substrates. A complete description with illustrations of macro- and microscopic characteristics appears in Barr (1983).

Thyridium chrysomallum (Berk. & Broome) O.E. Erikss. & J.Z. Yue, Syst. Ascom. 8: 12 (1989) Figs 36–37

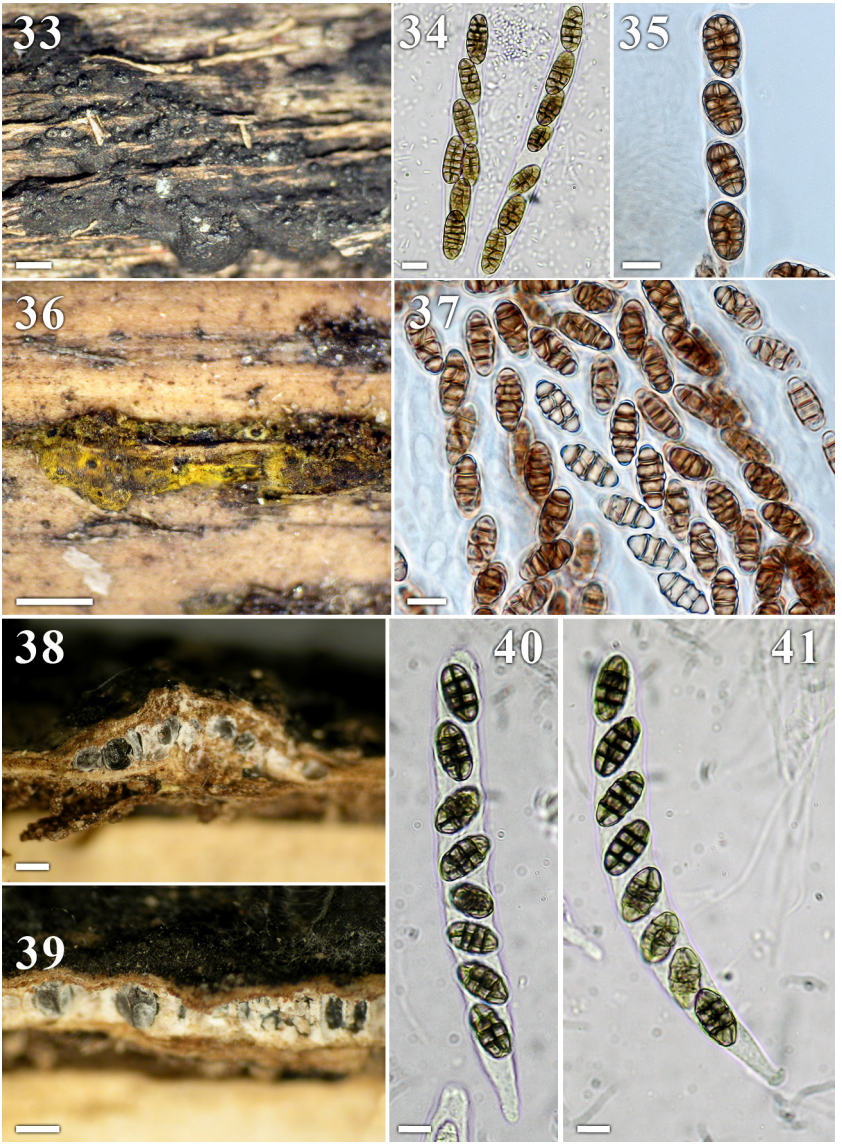
≡ *Melanospora chrysomalla* Berk. & Broome, J. Linn. Soc. Bot. 14: 130 (1873)

≡ *Bivonella chrysomalla* (Berk. & Broome) Sacc., Syll. Fung. 9: 990 (1891), as "*chrysomella*"

= *Sinosphaeria bambusicola* J.Z. Yue & O.E. Erikss. *Syst. Ascom.* 6: 231 (1987)

Specimens examined, **NEW ZEALAND**, **Bay of Plenty**, Te Puke, D.S.I.R. Research Orchard, on canes of *Actinidia deliciosa,* 15-VII-1981, coll. G.J. Samuels (81-209) & S.R. Pennycook, det. M.E. Barr [as *Thyridium vestitum* on *Actinidia chinensis*] (Herbarium of the University of Massachusetts in NY). **SRI LANKA**, Peradeniya, on palm stems, November 1868, coll. G.H.K. Thwaites 1071 (K(M) 36218, ex herb. M.J. Berkeley, holotype of *Melanospora chrysomalla*). **VENEZUELA, Aragua**, on Colonia Tovar-La Victoria road, ca 7 km from Colonia Tovar, on unidentified bamboo, 14-VII-1971, leg. K.P. Dumont, J.H. Haines & G.J. Samuels (NY, Dumont-VE 2192).

Remarks— Macroscopically this species is similar to *Mattirolia roseovirens* and also has ascospores with very thick septa but their color is pale brown and not greenish. The stroma reacts positively with KOH taking on a fuchsia color.



Figs. 33–41. ***Thyridium vestitum***: 33. Stroma (Thümen, 2249 in NY). 34–35. Asci and ascospores (M.E. Barr 2872 in NY). ***T. chrysomallum*** (NY, Dumont-VE 2192): 36. Stroma. 37. Ascospores. ***T. flavum*** (isotype K(M) 160957): 38–39. Stromata. 40–41. Asci and ascospores. Scale bars: 33 = 1 mm; 34, 35, 37, 40, 41 = 10 µm; 36, 38, 39 = 0.5 mm.

The sequences of *Thyridium chrysomallum* (as *Sinosphaeria bambusicola*) in Genbank have been shown to be erroneous and have been removed (Miller, pers. comm.), thus the taxonomic position of this species is not known.

Thyridium flavum Petch, Ann. Roy. Bot. Gard. Peradeniya 6(3): 226 (1917)
Figs. 38–41

Specimen examined, **SRI LANKA**, Peradeniya, on twigs of *Hevea brasiliensis*, February 1917, coll. Petch 4968 (isotype, K(M) 160957).

Remarks— The KOH– perithecia in the isotype specimen are blackish (lacking a yellowish color), short-necked, and grouped in rows under the bark of a *Hevea brasiliensis* branch. Under the microscope we observed cylindrical, unitunicate asci and dark brown ellipsoid ascospores, 16–20 × 8–10 µm, with 3(–5) transverse septa and 1 longitudinal septum, which correspond to the description by Petch (1917). We also observed many ascospores on the bark of the substrate giving the false appearance of conidia or formation of proliferate asci, a feature not noted by the author nor found in other species of *Thyridiaceae*.

Thyridium lasiacidis (Samuels & Rogerson) Checa, M.N. Blanco & G. Moreno, **comb. nov.** Figs 42–45

MycoBank MB 805474

≡ *Sinosphaeria lasiacidis* Samuels & Rogerson, Stud. Mycol. 31: 147 (1989)

Specimens examined, **FRENCH GUIANA**, Saül, 200 m, on dead culms of *Lasiacis ligulata*, 3-II-1986, leg. G.J. Samuels 3784A (Holotype, NY); II-1986, leg. G.J. Samuels 3773 (UME 33336).

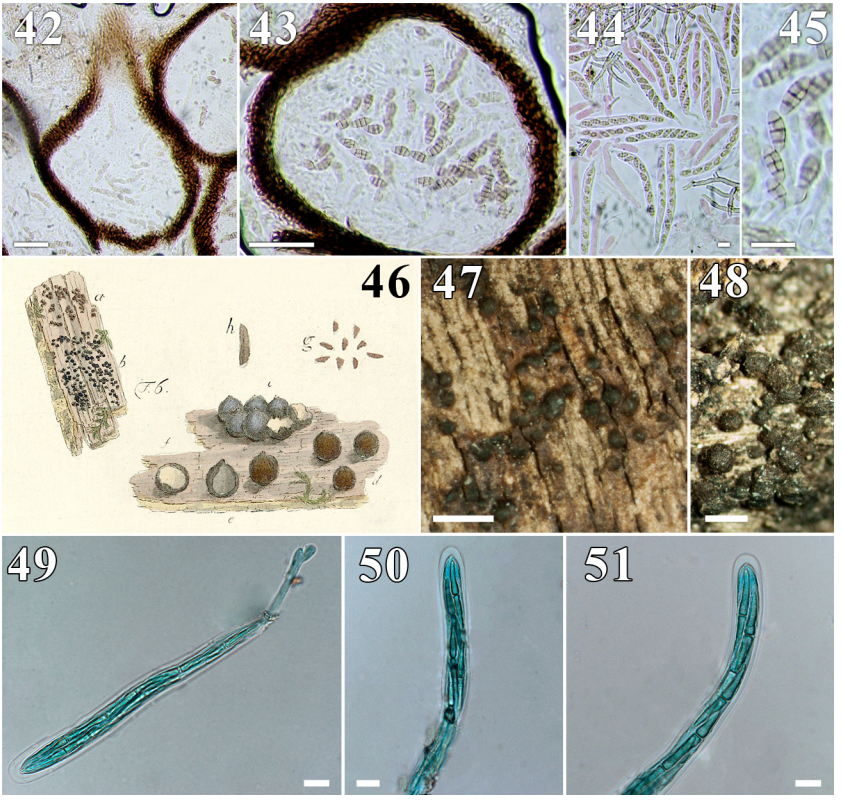
Stroma present, KOH positive. Asci clavate to broadly cylindrical. Ascospores very pale brown with 3 transverse septa and 1 longitudinal septum in median cells that are not conspicuously darkened.

Remarks— Because *Sinosphaeria* is considered a synonym of *Thyridium,* this species is transferred to *Thyridium*. It is similar to *T. chrysomallum* but has smaller spores (10–12 × 5–6 µm).

Key to species of *Thyridiaceae*

1. Stroma usually present, erumpent, with a loosely interwoven yellowish or brownish tomentum, KOH negative; perithecia globose without convergent ostioles; ascospores muriform, hyaline to greenish yellow when mature (***Mattirolia***) **2**

1. Stroma always present, immersed or erumpent, with interwoven yellowish, brownish or black tomentum and cells of the substrate, KOH negative or positive; perithecia globose with short or long necks, sometimes convergent ostioles; ascospores muriform, very pale brown to dark brown, or with wall thickened and pigmented only at the septa (***Thyridium***) **6**



Figs. 42–51 ***Thyridium lasiacidis*** (NSF BSR 8500236 holotype in NY): 42. Detail of the stroma. 43. Perithecium. 44. Asci and ascospores. 45. Detail of ascospores. ***Pseudotrichia mutabilis***: 46. Persoon's original drawing of *Sphaeria mutabilis* (tab. 7, fig. 6a, 6d, 6e). ***P. mutabilis*** (B 700014106): 47–48. Pseudothecia. 49. Ascus. 50–51. Detail of asci and ascospores. Scale bars: 42, 43 = 50 µm; 44, 45, 49–51 = 10 µm; 47 = 1 mm; 48 = 0.5 mm.

2. Perithecia solitary, surrounded with brownish tomentum; ascospores 3–4 transverse septa and 1 irregularly longitudinal septum ..... ***M. ohiensis***

2. Perithecia semi-immersed in a stroma or solitary, with yellowish tomentum **3**

3. Ascospores with 3 transverse septa ..... ***M. platensis***

3. Ascospores with >3 transverse septa **4**

4. Ascospores with 3–5(–7) transverse septa..... ***M. roseovirens***

4. Ascospores with more than 5 transverse septa **5**

5. Ascospores with 5–7 transverse septa ..... ***M. mutabilis***

5. Ascospores with 7–9(–11) transverse septa..... ***M. chrysogramma***

6. Stroma variable in size and sometimes in valsoid configuration, KOH negative; ascospores uniformly brown **7**

6. Stroma not in valsoid configuration KOH positive; ascospores with 3 transverse septa and 1 longitudinal septum, thickened, not uniformly brown **8**

7. Ascospores with 3–5(–8) transverse septa. . . . . ***T. vestitum***

7. Ascospores with fewer [3(–5)] transverse septa . . . . . ***T. flavum***

8. Ascospores 10–12 × 5–6 µm . . . . . ***T. lasiacidis***

8. Ascospores (12.5–)14–16.5(–17.5) × (6–)6.5–7.5 µm . . . . . ***T. chrysomallum***

Nomenclatural problem with *Sphaeria mutabilis*

In his description and illustration of *Sphaeria mutabilis,* Persoon (1798, 1801) provided few microscopic characters. His drawings, which are too small to illustrate detailed morphology, do not include ascospores. In addition, he did not provide ascospore measurements or identify the substrate. Fries (1823), who studied Persoon's specimen, observed that the specimens grew "ad ligna durisima quercina, ad terram prostata". Later, Barr (1990) studied Fries' material and gave a macro- and microscopic description of this species (see Table 1). Our observations of Fries' material agree with those of Barr (1990). This species is now regarded as *Pseudotrichia mutabilis* in the *Pleosporales*.

Quélet (1875) transferred *Sphaeria mutabilis* to *Lasiella,* but misapplied this name to a specimen growing on woody debris of willows and oak (now recognized as *Mattirolia mutabilis*). The distinction between Persoon's and Quélet's taxa was quickly recognised by Saccardo (1883: *Lasiosphaeria mutabilis* [p. 196] versus *Pleosphaeria mutabilis* [p. 306]) and by Winter (1884–87: *Herpotrichia mutabilis* [p. 209] versus *Strickeria mutabilis* [p. 288]).

Pseudotrichia mutabilis (Pers.) Wehm., Fungi of Maritime Provinces: 35 (1950) Figs 46–51

≡ *Sphaeria mutabilis* Pers., Icon. descr. Fung. 1: 24 (1798)

≡ *Lasiosphaeria mutabilis* (Pers.) Fuckel, Jahrb. Nassauischen Vereins Naturk. 25–26: 302 (1871)

≡ *Lasiella mutabilis* (Pers.) Quél. [non sensu Quélet], Mém. Soc. Émul. Montbéliard, 2e série, 5: 517 (1875)

≡ *Herpotrichia mutabilis* (Pers.) G. Winter, Rabenh. Krypt.-Fl., Ed. 2, 1(2): 209 (1885)

≡ *Enchnosphaeria mutabilis* (Pers.) Höhn., Sitzungsber. K. Akad. Wiss., Math.-Naturwiss. Kl., Abt. 1, 126: 346 (1917)

≡ *Khekia mutabilis* (Pers.) Petr., Ann. Mycol. 38: 203 (1940)

Specimens examined, **GERMANY**: **Lothringen**, [now = **FRANCE: Lorraine**, Moselle], Forbach, Schönecker wald, 26-IX-1913, *leg.* Dr. A. Ludwig, (B 700014106 as *Herpotrichia mutabilis*). **SWEDEN**: **Småland**, Femsjö, Herb. E. Fries (UPS F-07198, 133504); **Gästrikland**, Gävle, Lövudden, on the bank of the R. Gavleån, *Alnus* (?), ramus dejectus, 7-I-1973, leg. J. Ax. Nannfeldt nº 22906 (UPS F-126407, 406224 as

Herpotrichia mutabilis); in ramis dejectis, 17-VIII-1950, leg. J. Ax. Nannfeldt nº 11084, (UPS F-126408, 406225 as *Lasiosphaeria*, rev. G. Carroll 1963 as "*Lophiostoma mutabilis*". **USA**: **Alabama**, Cort. Cerasi Caroliniani, *leg.* Beaumont ex. Herb. M.A. Curtis (UPS F-04319, 57500, Herb. E. Fries).

Remarks— Although Persoon (1798) did not describe the hamathecium, asci, and ascospores verbally in his protologue, he did include them in his drawing. We provide a description of those features in Table 1.

Table 1. A morphological comparison of *Pseudotrichia mutabilis* and *Mattirolia mutabilis*.

	*P. mutabilis** UPS (F-01798) 133504	*M. mutabilis*** UPS (F-126406) 406223
Ascomata	Scattered or aggregated; (Stroma not observed); Tomentum brown-yellowish; Ostiole papillate	Scattered or aggregated; (Stroma not observed); Tomentum yellow to yellow-greenish; Ostiole subpapillate and blackish
Asci	**Bitunicate,** clavate, (90–)120–155 × 12–20 µm	**Unitunicate,** Cylindrical-clavate, 80–90 × 10–15 µm.
Hamathecium	**Trabecular pseudoparaphyses**	**Paraphyses**
Ascospores	26–39 × (6–)7–9 µm, ellipsoid-fusiform **1–3 tranverse septa** **0 longitudinal septa** Hyaline to light brown.	19–22 × 8–12 µm, ellipsoid **5–7 transverse septa** **1–2 longitudinal septa** Hyaline to lightly yellow-greenish

* Description from Barr (1990) based on material collected by Fries from Sweden.

** Data from this paper.

Barr (1984) provided a comprehensive description and illustration of *Pseudotrichia mutabilis,* although she did not study the type specimen.

Conclusions

After examining the type species of *Balzania*, *Mattirolia*, *Thyridium*, and *Thyronectroidea*, we accept only *Mattirolia* (with *Balzania* and *Thyronectroidea* in synonymy) and *Thyridium* within the *Thyridiaceae*. We can define *Mattirolia* by a stroma that is generally present, KOH negative, cylindrical to clavate asci, and muriform ascospores that become yellow-green when mature. *Thyridium* is characterized by the presence of stromata, KOH variable, cylindrical or clavate asci, and very pale brown to dark brown muriform ascospores that lack green tones.

Based on our examination of the type specimens, *Thyridium ohiense* does not belong in *Thyridium* due to the absence of stroma and the presence of hyaline or yellowish spores. Its macro- and microscopic characteristics place it instead in *Mattirolia.*

Balzania, a monotypic genus described more than 100 years ago by Spegazzini (1898) for *Balzania platensis*, which has been collected only once, must be included within *Mattirolia*, as Rossman et al. (1999) suggested. *Thyronectroidea* is also a monotypic genus, which we consider synonymous with *Mattirolia*. The type species, *T. chrysogramma,* appears macroscopically similar to *M. roseovirens,* and the ascospores are hyaline to faintly greenish when mature. As these two species are congeneric, we use the name *M. chrysogramma*.

Because of Quélet's (1875) misapplication of the name, *Lasiella mutabilis* has been misinterpreted by different authors. The earliest valid name for Quélet's species was *Pleosphaeria mutabilis*, here recombined as *Mattirolia mutabilis* in the *Thyridiaceae; Pseudotrichia mutabilis,* based on Persoon's *Sphaeria mutabilis,* belongs in the order *Pleosporales.*

Acknowledgments

We wish to express our gratitude to Luis Monje and Ángel Pueblas of the Department of Drawing and Scientific Photography at the Alcalá University for their help in the digital preparation of the photographs. And we are grateful to Javier Rejos, curator of the AH herbarium, for his assistance with the specimens examined in the present study. And especially we are grateful to the curators of the herbaria B, BPI, FH, K, LPS, NY, S, and UME for sending us various materials for this study. We are very thankful to Shaun Pennycook and Scott Redhead for their help in resolving nomenclatural and taxonomic problems that have arisen. We express our gratitude to Amy Rossman and Larissa Vasilyeva for reviewing the manuscript and adding a number of useful comments. Finally we would like to thank David Mitchell and Laura Yebes for their help in the translation and facilitating the comprehension of the text.

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